

## CLAIMS:

1. An ultrasonic imaging apparatus comprising:  
an ultrasonic probe;  
a plurality of acoustic elements configured and arranged to form a two-dimensional array, said two-dimensional array configured and adapted to fit within the ultrasonic probe wherein said plurality of acoustic elements includes at least one active acoustic element capable of generating an acoustic pulse and/or receiving an echo signal; and  
a beam controller coupled to said two-dimensional array, said beam controller capable of driving the at least one active acoustic element to produce said acoustic pulse for impinging an acoustic target to generate at least one echo signal, and having associated circuitry capable of controlling directional movement of said acoustic pulse by tractor treading.
2. The ultrasonic imaging apparatus of claim 1, wherein the beam controller further includes associated circuitry capable of controlling directional movement of said acoustic pulse by beam steering.
3. The ultrasonic imaging apparatus of claim 1, further including a signal processor coupled to said two-dimensional array for processing the at least one echo signal, thereby forming at least one image signal.
4. The ultrasonic imaging apparatus of claim 1, wherein said two-dimensional array is configured and arranged in a substantially planar configuration.
5. The ultrasonic imaging apparatus of claim 1, wherein said two-dimensional array is configured and arranged in a substantially cylindrical configuration.
6. The ultrasonic imaging apparatus of claim 1, wherein said two-dimensional array is configured and arranged in a substantially convex configuration.
7. The ultrasonic imaging apparatus of claim 7, wherein said convex configuration includes substantially equal lateral and longitudinal dimensions.
8. A method for improving volumetric imaging in an ultrasonic imaging apparatus comprising the steps of:  
providing an ultrasonic probe;  
providing a plurality of acoustic elements configured and arranged to form a two-dimensional array, said two-dimensional array configured and adapted to fit within the

ultrasonic probe wherein said plurality of acoustic elements includes at least one active acoustic element capable of generating an acoustic pulse and/or receiving an echo signal;

providing a beam controller coupled to said two-dimensional array, said beam controller capable of driving the at least one of active acoustic element to produce said acoustic pulse for impinging an acoustic target to generate at least one echo signal and having associated circuitry capable of controlling directional movement of said acoustic pulse by tractor treading; and

actuating said beam controller to generate and move said acoustic pulse.

9. The method of claim 8, wherein the beam controller further includes associated circuitry capable of controlling directional movement of said acoustic pulse by beam steering.

10. The method of claim 8, further comprising the step of providing a signal processor coupled to said two-dimensional array for processing the at least one echo signal, thereby forming at least one image signal.

11. The method of claim 9, further comprising the step of displaying data corresponding to the at least one image signal.

12. The method of claim 8, wherein said two-dimensional array is configured and arranged in a substantially planar configuration.

13. The method of claim 8, wherein said two-dimensional array is configured and arranged in a substantially cylindrical configuration.

14. The method of claim 8, wherein said two-dimensional array is configured and arranged in a substantially convex configuration.

15. The method of claim 14, wherein said convex configuration includes substantially equal lateral and longitudinal dimensions.

16. An ultrasonic imaging kit comprising:  
at least two ultrasonic probes, each having a transducer array and associated circuitry where each ultrasonic probe is configured and dimensioned for alternative placement within an ultrasonic system, at least one ultrasonic probe further including a plurality of acoustic elements configured and arranged to form a two-dimensional array, said two-dimensional array configured and adapted to fit within the ultrasonic probe wherein said plurality of acoustic elements includes at least one active acoustic element capable of generating an acoustic pulse and/or receiving an echo signal; and

a beam controller coupled to the circuitry of the ultrasonic probe and in communication with said transducer array disposed within said ultrasonic probe, said beam controller capable of driving the at least one active acoustic element to produce said acoustic pulse for impinging an acoustic target to generate at least one echo signal and having associated circuitry capable of controlling directional movement of said acoustic pulse by tractor treading.

17. The ultrasonic imaging kit of claim 16, wherein the beam controller further includes associated circuitry capable of controlling directional movement of said acoustic pulse by beam steering.

18. The ultrasonic imaging kit of claim 16, further including a signal processor coupled to said two-dimensional array for processing the at least one echo signal, thereby forming at least one image signal.

19. The ultrasonic imaging kit of claim 16, wherein said two-dimensional array is configured and arranged in a substantially planar configuration.

20. The ultrasonic imaging kit of claim 16, wherein said two-dimensional array is configured and arranged in a substantially cylindrical configuration.

21. The ultrasonic imaging kit of claim 16, wherein said two-dimensional array is configured and arranged in a substantially convex configuration.

22. The ultrasonic imaging kit of claim 21, wherein said convex configuration includes substantially equal lateral and longitudinal dimensions.

23. An ultrasonic imaging system comprising:

an ultrasonic probe;

a plurality of acoustic elements configured and arranged to form a two-dimensional array, said two-dimensional array configured and adapted to fit within the ultrasonic probe wherein said plurality of acoustic elements includes at least one active acoustic element capable of generating an acoustic pulse and/or receiving an echo signal; and

a beam controller coupled to said two-dimensional array, said beam controller capable of driving the at least one active acoustic element to produce said acoustic pulse for impinging an acoustic target to generate at least one echo signal, and having associated circuitry capable of controlling directional movement of said acoustic pulse by tractor treading.

24. The ultrasonic imaging system of claim 23, further comprising:

a signal processor coupled to said two-dimensional array for processing the at least one echo signal, thereby forming at least one image signal;

means for connecting said ultrasonic probe to an ultrasonic imaging apparatus; and  
means for displaying the at least one image signal.

25. The ultrasonic imaging system of claim 23, wherein the beam controller includes associated circuitry capable of controlling directional movement of said acoustic pulse by beam steering.

26. The ultrasonic imaging system of claim 23, wherein said two-dimensional array is configured and arranged in a substantially planar configuration.

27. The ultrasonic imaging system of claim 23, wherein said two-dimensional array is configured and arranged in a substantially cylindrical configuration.

28. The ultrasonic imaging system of claim 23, wherein said two-dimensional array is configured and arranged in a substantially convex configuration.

29. The ultrasonic imaging system of claim 28, wherein said convex configuration includes substantially equal lateral and longitudinal dimensions.